

CLAIM LISTING

This listing of claims replaces all prior versions, and listings, of claims in the application:

1. (Currently Amended) An electrochemical cell comprising:
 - (a) a cathode comprising an electroactive sulfur-containing material;
 - (b) an anode comprising lithium; and
 - (c) a nonaqueous electrolyte, wherein the electrolyte comprises:
 - (i) one or more nonaqueous solvents selected from the group consisting of acyclic ethers, cyclic ethers, polyethers, and sulfones;
 - (ii) one or more lithium salts; and
 - (iii) one or more N-O additives, wherein the one or more N-O additives comprises an inorganic nitrite selected from one or more of the group consisting of lithium nitrite, potassium nitrite, cesium nitrite, and ammonium nitrite.
2. (Currently Amended) The cell of claim 1 wherein the one or more N-O additives further comprise ~~is selected from~~ one or more of the group consisting of inorganic nitrates, organic nitrates, ~~inorganic nitrites~~, organic nitrites, and organic nitro compounds.
3. (Cancelled)
4. (Cancelled)
5. (Previously Presented) The cell of claim 2 wherein the organic nitro compound is selected from one or more of the group consisting of nitromethane, nitropropane, nitrobenzene, dinitrobenzene, nitrotoluene, dinitrotoluene, nitropyridine, dinitropyridine, nitrobutanes, and dialkyl imiazolium.
6. (Original) The cell of claim 1 wherein the one or more lithium salts is selected from one or more of the group consisting of LiSCN, LiCF₃SO₃, and LiN(CF₃SO₂)₂.
7. (Currently Amended) ~~The cell of claim 1~~ An electrochemical cell comprising:

(a) a cathode comprising an electroactive sulfur-containing material;

(b) an anode comprising lithium; and

(c) a nonaqueous electrolyte, wherein the electrolyte comprises:

(i) one or more nonaqueous solvents selected from the group consisting of acyclic ethers, cyclic ethers, polyethers, and sulfones;

(ii) one or more lithium salts; and

(iii) one or more N-O additives;

wherein the one or more lithium salts consist of LiSCN and $\text{LiN}(\text{CF}_3\text{SO}_2)_2$ and the N-O additive comprises lithium nitrate.

8. (Original) The cell of claim 1 wherein the concentration of the one or more N-O additives in the electrolyte is from about 0.02 m to 2.0 m.
9. (Original) The cell of claim 1 wherein the concentration of the one or more N-O additives in the electrolyte is from about 0.1 m to 1.5 m.
10. (Original) The cell of claim 1 wherein the concentration of the one or more N-O additives in the electrolyte is from about 0.2 m to 1.0 m.
11. (Original) The cell of claim 1 wherein the concentration of the one or more lithium salts in the electrolyte is from about 0.2 m to about 2.0 m.
12. (Cancelled)
13. (Previously Presented) The cell of claim 1 wherein the cyclic ether is selected from one or more of the group consisting of tetrahydrofuran, 2-methyl tetrahydrofuran, tetrahydropyran, 1,3-dioxolane, 1,3-dioxane, 1,4-dioxane, and trioxane.
14. (Cancelled).
15. (Cancelled)

16. (Original) The cell of claim 1 wherein the electroactive sulfur-containing material comprises greater than 75 % by weight of sulfur.
17. (Original) The cell of claim 1 wherein the electroactive sulfur-containing material comprises elemental sulfur.
18. (Original) The cell of claim 1 wherein the anode comprises lithium metal.
19. (Original) The cell of claim 1 that further includes a separator disposed between the anode and the cathode.
20. (Original) A battery comprising a casing and one or more cells of claim 1.
21. (Currently Amended) ~~The cell of claim 1~~ An electrochemical cell comprising:
 - (a) a cathode comprising an electroactive sulfur-containing material;
 - (b) an anode comprising lithium; and
 - (c) a nonaqueous electrolyte, wherein the electrolyte comprises:
 - (i) one or more nonaqueous solvents selected from the group consisting of acyclic ethers, cyclic ethers, polyethers, and sulfones;
 - (ii) one or more lithium salts; and
 - (iii) one or more N-O additives, wherein the one or more N-O additives is lithium
nitrate.
22. (Original) The cell of claim 1 wherein the nonaqueous solvent comprises dioxolane.
23. (Original) The cell of claim 1 wherein the one or more solvents consists of dimethoxyethane and dioxolane.
24. (Original) The cell of claim 19 wherein the one or more N-O additives was included as part of the separator and was introduced into the electrolyte after the electrolyte came into contact with the separator.

25. (Original) The cell of claim 1 wherein the one or more N-O additives was included as part of the cathode and was introduced into the electrolyte after the electrolyte came into contact with the cathode.
26. (Currently Amended) An electrochemical cell comprising:
- (a) a cathode comprising an electroactive sulfur-containing material;
 - (b) an anode comprising lithium; and
 - (c) a nonaqueous electrolyte, wherein the electrolyte comprises:
 - (i) one or more nonaqueous solvents selected from the group consisting of acyclic ethers, cyclic ethers, polyethers, and sulfones; and
 - (ii) one or more N-O additives, wherein the one or more N-O additives comprises an inorganic nitrite selected from one or more of the group consisting of lithium nitrite, potassium nitrite, cesium nitrite, and ammonium nitrite.
27. (Previously Presented) The cell of claim 26 wherein the one or more N-O additives further comprise ~~is selected from~~ one or more of the group consisting of inorganic nitrates, and organic nitrates, ~~and inorganic nitrites.~~
28. (Cancelled)
29. (Cancelled)
30. (Original) The cell of claim 26 wherein the concentration of the one or more N-O additives in the electrolyte is from about 0.2 m to 2.0 m.
31. (Cancelled)
32. (Original) The cell of claim 26 that further includes a separator disposed between the anode and the cathode.

33. (Original) The cell of claim 32 wherein the one or more N-O additives was included as part of the separator and introduced into the electrolyte after the electrolyte came into contact with the separator.
34. (Original) The cell of claim 26 wherein the one or more N-O additives was included as part of the cathode and introduced into the electrolyte after the electrolyte came into contact with the cathode.
35. (Original) A battery comprising a casing and one or more cells of claim 26.
36. (Cancelled)
37. (Previously Presented) The cell of claim 1 wherein the one or more lithium salts are selected from one or more of the group consisting of LiSCN, LiBr, LiI, LiClO₄, LiAsF₆, LiSO₃CF₃, LiSO₃CH₃, LiBF₄, LiB(Ph)₄, LiPF₆, LiC(SO₂CF₃)₃, and LiN(SO₂CF₃)₂.
38. (Previously Presented) The cell of claim 22 wherein the nonaqueous solvent comprises greater than 40% by weight dioxolane.
39. (Previously Presented) The cell of claim 1 wherein the nonaqueous electrolyte comprises two or more solvents selected from acyclic ethers, glymes and cyclic ethers.
40. (Previously Presented) The cell of claim 39 wherein one of the two or more non aqueous solvents is dioxolane.
41. (Previously Presented) The cell of claim 1 wherein the one or more nonaqueous solvents consist of:
- 1,3-dioxolane and dimethoxyethane; or
 - 1,3-dioxolane and diethyleneglycol dimethyl ether; or
 - 1,3-dioxolane and triethyleneglycol dimethyl ether; or
 - 1,3-dioxolane and sulfolane.

42. (Currently Amended) The cell of claim ~~[[38]]~~ 41 wherein the electrolyte comprises a binary mixture and the weight ratio of the components of the binary mixture are from about 5 to 95 to 95 to 5.
43. (Currently Amended) The cell of claim ~~[[38]]~~ 41 wherein the non aqueous solvent comprises greater than 40% by weight dioxolane.
44. (New) The cell of claim 21 wherein the concentration of the one or more N-O additives in the electrolyte is from about 0.02 m to 2.0 m.
45. (New) The cell of claim 21 wherein the cyclic ether is selected from one or more of the group consisting of tetrahydrofuran, 2-methyl tetrahydrofuran, tetrahydropyran, 1,3-dioxolane, 1,3-dioxane, 1,4-dioxane, and trioxane.
46. (New) The cell of claim 21 wherein the electroactive sulfur-containing material comprises elemental sulfur.
47. (New) The cell of claim 21 wherein the anode comprises lithium metal.
48. (New) The cell of claim 21 wherein the nonaqueous solvent comprises dioxolane.
49. (New) The cell of claim 48 wherein the nonaqueous solvent comprises greater than 40% by weight dioxolane.
50. (New) The cell of claim 21 wherein the nonaqueous electrolyte comprises two or more solvents selected from acyclic ethers, glymes and cyclic ethers.
51. (New) The cell of claim 50 wherein one of the two or more non aqueous solvents is dioxolane.
52. (New) The cell of claim 21 wherein the one or more nonaqueous solvents consist of:

1,3-dioxolane and dimethoxyethane; or
1,3-dioxolane and diethyleneglycol dimethyl ether; or
1,3-dioxolane and triethyleneglycol dimethyl ether; or
1,3-dioxolane and sulfolane.

53. (New) The cell of claim 52 wherein the electrolyte comprises a binary mixture and the weight ratio of the components of the binary mixture are from about 5 to 95 to 95 to 5.
54. (New) The cell of claim 53 wherein the non aqueous solvent comprises greater than 40% by weight dioxolane.